

Having thus described the invention, what is claimed is:

1. A method for delivering at least a build material and removing waste material in solid freeform fabrication apparatus to form a three-dimensional object, the method comprising the steps of:  
  
delivering build material to a dispensing device;  
  
dispensing said build material from said dispensing device in a layerwise fashion to form the three-dimensional object;  
  
producing waste material from said dispensed material;  
  
depositing said waste material in a waste receptacle, wherein said depositing step comprises:
  - a) collecting said waste material in an intermediate vessel;
  - b) releasing from said intermediate vessel to said waste receptacle said collected waste material when a pre-set amount of said waste material has been collected; and
  - c) repeating said collecting and releasing steps until three-dimensional object is formed.
2. The method of claim 1 wherein said collecting step comprises sealing a bottom drain and opening an atmospheric vent of said intermediate vessel thereby allowing waste material to collect in said intermediate vessel.

3. The method of claim 1 wherein said step of releasing comprises opening a bottom drain and closing an atmospheric vent of said intermediate vessel responsive to a level reading in said intermediate vessel.
4. The method of claim 1 further comprising the step of curing said waste material in said waste receptacle.
5. The method of claim 4 wherein said waste material is cured by exposing said waste material to actinic radiation.
6. The method of claim 1 wherein said dispensing step further comprises dispensing a build material to form said three-dimensional object and a support material to form support for said three-dimensional object, said build and support materials being held in separate containers.
7. The method of claim 6 wherein said producing step produces waste material from both build material and support materials.
8. The method of claim 6 further comprising :  
  
delivering at least one container to a queue station, the container holding a discrete amount of at least said build material; and  
  
removing said discrete amount of at least said material from said container for delivery to said dispensing device.
9. A material feed and waste system for a solid freeform fabrication apparatus, the system comprising:  
  
means for delivering at least one container to a queue station, the container holding a discrete amount of at least a build material;

removing said discrete amount of material from said container for delivery to said dispensing device.

means for delivering at least a build material to at least one dispensing device;

means for dispensing said discrete amount of material by said dispensing device in a layerwise fashion to form via a plurality of layers a three-dimensional object;

means for normalizing the layers of the three-dimensional object wherein waste material is produced;

means for depositing said waste material in a waste receptacle, wherein said means for depositing said waste material comprises:

a) means for collecting said waste material in an intermediate vessel;

b) means for releasing from said intermediate vessel to said waste receptacle said collected waste material when a pre-set amount of said waste material has been collected; and

c) means for repeating said collecting and releasing means until three-dimensional object is formed.

10. The apparatus of claim 9 wherein said intermediate vessel comprises:

a) an open inlet port

b) a level sensor set to activate at a pre-set level

- c) a sealable bottom drain; and
  - d) a sealable atmospheric vent.
11. The apparatus of claim 10 wherein said means for collecting said waste material in said intermediate vessel comprises an actuator for simultaneously sealing said sealable bottom drain and opening said sealable atmospheric vent to allow said intermediate vessel to fill through said open inlet port.
12. The apparatus of claim 11 wherein said means for releasing said collected waste material from said intermediate vessel comprises an actuator for simultaneously sealing said sealable atmospheric vent and opening said sealable bottom drain when said level sensor activates at said pre-set level to allow said collected waste to drain to said waste receptacle.
13. The system of claim 9 further comprising means for curing said waste material after said waste material is delivered to said waste receptacle.
14. The system of claim 13 wherein the means for curing said waste material cures said waste material by exposure to actinic radiation or thermal energy.
15. The system of claim 9 further comprises means for delivering at least one container to a queue station, the container holding a discrete amount of at least said build material; and
- means for removing said discrete amount of at least said build material from said container.

16. A solid freeform fabrication apparatus for forming a three-dimensional object in a layerwise fashion by dispensing at least one material, the apparatus comprising:

a build environment having a build platform for supporting the three-dimensional object while it is being formed;

at least one dispensing device adjacent said build platform for dispensing said material to form layers of the three-dimensional object;

a motion means for respectively moving said dispensing device and said build platform with respect to each other;

means for normalizing the layers of said dispensed material thereby producing waste material;

a computer controller for receiving object data descriptive of the three-dimensional object and for processing the data and controlling the apparatus when forming the three-dimensional object; and

a material delivery and waste removal means for receiving and delivering said at least one material to said dispensing device and depositing said waste material in a waste receptacle, wherein said waste removal means includes means for depositing said waste material comprising:

a) means for collecting said waste material in an intermediate vessel;

b) means for releasing from said intermediate vessel to said waste receptacle said collected waste material when a pre-set amount of said waste material has been collected; and

c) means for repeating said collecting and releasing steps until the three-

dimensional object is formed.

17. The apparatus of claim 16 wherein said intermediate vessel comprises
  - a). an open inlet port;
  - b). a level sensor set to activate at a pre-set level;
  - c). a sealable bottom drain; and
  - d). a sealable atmospheric vent.
16. The apparatus of claim 17 wherein said means for collecting said waste material in said intermediate vessel comprises an actuator for simultaneously sealing said sealable bottom drain and opening said sealable atmospheric vent to allow intermediate vessel to fill through said inlet port.
19. The apparatus of claim 18 wherein said means for releasing said collected waste material from said intermediate vessel comprises an actuator for simultaneously sealing said sealable atmospheric vent and opening said sealable bottom drain when said level sensor activates at said pre-set level to allow said collected waste to drain to said waste receptacle.
20. The material and waste removal means according to claim 16 further comprising:
  - a) means for receiving at least one container, the container holding a discrete amount of said at least one material; and
  - b) means for removing said discrete amount of said at least one material from the container.
21. The apparatus of claim 20 further comprising means for ejecting said container when substantially all of the material in the container have been removed.

22. The apparatus of claim 16 further comprising a waste curing means for curing said waste material after said waste material is deposited in said waste receptacle, said waste material being cured by exposure to actinic radiation or thermal energy.
23. The apparatus of claim 16 wherein said dispensing device dispenses a build material to form the three-dimensional object and a support material for forming support for the three-dimensional object.
24. The apparatus of claim 16 having two dispensing devices, one dispensing device dispensing a build material to form the three-dimensional object, and the other dispensing device dispensing a support material to form support for the three-dimensional object.